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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,896	05/16/2006	Renato Bugge	BRW-002US	1816

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EXAMINER	
LANGMAN, JONATHAN C	
ART UNIT	PAPER NUMBER
1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,896	BUGGE ET AL.	
	Examiner	Art Unit	
	JONATHAN C. LANGMAN	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *1-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 24-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 24, the applicant originally claims and teaches a formula of $Al_{1-x-z}Ga_xIn_zAs_{1-y}Sb_y$ where among other things $0 \leq z < 1$. The applicant amended the claim to read that $0 < z < 1$. This range is a new range that requires a quinternary formula of AlGaInAsSb. The applicant is not supported for this new range of z. The specification only teaches a range of $0 \leq z < 1$.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 24 and 26-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Mishurnyi et al. (Multicomponent Sb-Based solid solutions grown from Sb-Rich liquid phases").

Mishurnyi et al. teach a AlGaInAsSb quinternary layer (abstract) and a formula of $Al_xGa_{1-x-z}In_zAs_ySb_{1-y}$ (page 38 second paragraph). Mishurnyi do not teach specifically teach etching the layer however this step is a product by process step and given little to no patentable weight. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Regarding claims 26-31, Mishurnyi teaches using the layer to make lasers (page 40, second paragraph).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24 and 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishurnyi et al. as applied to claims 24, and 26-31 above, in view of Boos et al., (US 5,798,540).

Mishurnyi et al. teach a AlGaInAsSb quinternary layer (abstract) and a formula of $Al_xGa_{1-x-z}In_zAs_ySb_{1-y}$ (page 38 second paragraph). Mishurnyi teaches using the layer in lasers. Mishurnyi does not teach etching the substrate.

Boos et al. teach an electronic semiconductor device comprising a HEMT, comprising layers of InAlAsSb, AlGaAsSb, etc. (col. 3, lines 20 and 45-50) layers. HEMT's are known in the art to form optical sensors. To form these structures Boos teaches etching the layers with a wet etching solution comprising, lactic or acetic acid, hydrogen peroxide, and hydrofluoric acid (col. 4, lines 54-66). Lactic or acetic acid is an organic acid, and hydrogen peroxide is an oxidizing agent. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use this etchant technique taught by Boos in order to etch the hetero structures of Mishurnyi in order to form a desired structure. Although Boos may not specifically teach that the etchant is used on AlGaInAsSb structures, a routineer in the art would have appreciated the work since Boos teaches etching AlInAsSb, and would have applied this known etching composition to Mishurnyi in order to obtain a desired structure. Boos

has shown that these etching techniques for compound semiconductors of the AlGaIn series are beneficial and a known technique in the art.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mishurnyi or Mishurnyi in view of Boos, and further in view of Garbuzov et al. ("2.3-2.7 micron Room temperature CW operation of InGaAsSb-AlGaAsSb Broad Waveguide SCH-QW Diode Lasers").

Mishurnyi teach an AlGaInAsSb layer as described above. Mishurnyi do not specifically teach doping the layer. However it is known in the art and taught by Garbuzov et al., that to achieve desired electrical properties doping GaAlIn series layers with Te in order to achieve n-type layers, and to use Be to achieve p-type layers. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to dope the layers as taught by Mishurnyi with known dopants such as Te for n-type doping and Be for p-type doping, in order to obtain desired electrical properties as is known in the art.

Claims 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishurnyi or Mishurnyi in view of Boos, and further in view of Deryagin et al., "High Quality AlGaAsSb, AlGaAsSb and InGaAsSb epitaxial layers Grown by LPVE from Sb-rich melts".

Mishurnyi et al. do not disclose the type of lasers these layers may be used in. Deryagin et al. teach that AlGaAsSb layers may be used in lasers, photodiodes, and

Led's, (introduction). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the semiconductor device and etching steps of Boos et al., to form and use the structure as an LED, Photodiode, sensor and Laser, as is known in the art.

Regarding claims 29-30, the semiconducting structure, is more than capable of being used as a part of a VCSEL or a PCDFL as is known in the art.

Response to Arguments

Applicant's arguments with respect to claims 24-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN C. LANGMAN whose telephone number is (571)272-4811. The examiner can normally be reached on Mon-Thurs 8:00 am - 6:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCL

/Timothy M. Speer/
Primary Examiner
Art Unit 1794